

southwestern Texas had decidedly heavy rains during the last week.

In the Pacific Northwest there was practically no rain until the 9th, but afterwards considerable amounts were received, the falls about the 16th being especially liberal and widespread. The San Joaquin Valley in California received considerable rainfall for the time of the year, about the 7th.

Over two-thirds of the States failed to receive their June normal amounts of rainfall. The exceptions were New Jersey and the New England States, Michigan and Wisconsin, and the Pacific States, with Arizona. Massachusetts received more than twice its normal, on the average, Oregon an inch more than normal, and Washington over 2 inches more than normal.

In the States of the western half, which have not been accounted for above, there was usually from a half to four-fifths of the normal June rainfall, but southern Idaho and northern Utah had remarkably little, while the middle and lower Rio Grande Valley had more than normal.

In the lower Mississippi Valley and to eastward decided shortages were noted, especially in northern Georgia and districts adjacent. From Missouri and Iowa eastward the quantities were usually not much below normal, and they generally exceeded the normal in northwestern Indiana and the upper Ohio Valley.

In western Washington 16.39 inches was measured at one station, the largest in the United States proper. In

the South, Runge, Tex., measured 12.58 inches, while the East was led by 11.33 inches at a station in Putnam County, N. Y.

SNOWFALL

Scarcely any snowfall was reported from the elevated stations of the Western States, save that a few points in the Sierra Nevada Mountains had measurable falls. It is stated that the northern part of Flathead County, Mont., had an unusually heavy June snowstorm on the 16th and 17th.

SUNSHINE AND RELATIVE HUMIDITY

More than the average amount of sunshine was received from the eastern foothills of the Rocky Mountains eastward to the Atlantic, except in portions of the Lake region, the northern Ohio Valley, the far Northeast, and the western Gulf States. More than normal was likewise received in much of California and southeastern Oregon. Elsewhere it was generally near the average.

The relative humidity was above the normal throughout portions of the Pacific States, the southern plateau, and the southern portion of Texas, the upper Lake region, portions of the Ohio Valley and northern Appalachian Mountains and the New England States. However, in all cases the departures were but slightly above normal. Elsewhere the humidity was generally below normal with minus departures rather pronounced in the southern Appalachian region, the southern portions of the Great Plains, and the northern Rocky Mountains.

SEVERE LOCAL STORMS, JUNE, 1931

The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A more complete statement will appear in the Annual Report of the Chief of Bureau]

Place	Date	Time	Width of path, yards ¹	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
Olar (near), S. C.	1	5:30 p. m.	4 mi.		\$65,000	Hail	Severe crop damage; path, 7 miles.	Official, U. S. Weather Bureau.
Billings to Ballantine, Mont.	2	4-5 p. m.			25,000	Tornadic wind	Damage chiefly to oil refinery.	Do.
Bridgewater (near), S. Dak.	2	5:30 p. m.	16		500	Small tornado	Cabins destroyed.	Do.
Grand Rapids (near), Mich.	3					Thunderstorms	Power and telephone service interrupted; several buildings damaged.	Do.
Warren, Ill.	3					Wind	Farm buildings and trees damaged.	Do.
Lafayette County, Wis. (southern)	4		4 mi.		4,000	Thundersquall	Several barns damaged or demolished; path, 8 miles long.	Do.
Northboro, Iowa (southwest of)	4				\$75	Tornado and hail	Minor damage to property; poultry killed.	Do.
Waushara County, Wis. (eastern)	4	11 p. m.	3 mi.		3,000	Thundersquall	Buildings damaged.	Do.
Apple River, Ill., and vicinity	5	12:30 a. m.	4 mi.			Severe wind	Property damaged; several thousand dollars.	Do.
Union County, Iowa	5	3-7 a. m.			2,000	Rain and hail	Truck gardens hurt.	Do.
Decatur County, Iowa	5	5 a. m.	3 mi.		4,200	Wind, rain and floods	Buildings and crops damaged; path, 6 miles.	Do.
French (near) to Sedan, N. Mex.	5	12:15-6 p. m.		1	30,000	Tornado and hail	Livestock killed; buildings and orchards wrecked; path, 90 miles long.	Do.
Harper County, Okla. (northern)	5	4 p. m.	2 mi.		160,000	Hail	Damage chiefly to crops; path, 24 miles long.	Do.
Logan and Thomas Counties, Kans.	5	6 p. m.	1,760		30,000	do.	Wheat total loss in places; path, 30 miles long.	Do.
Freedom (near), Okla.	5	6:20 p. m.			15,000	do.	Corps damaged.	Do.
Clark County, Iowa	6	2-7 p. m.			3,000	Wind and hail	Greenhouses and crops damaged; path, 12 miles long.	Do.
Knox and Cedar Counties, Nebr.	6	4 p. m.	Up to 2 mi.		65,000	Tornado	Farm buildings demolished; crops injured 10 per cent in places; path, 18 miles long.	Do.
Indiana County, Pa. (central)	6	4-5 p. m.	1,760		10,000	Hail and wind	Many buildings unroofed; orchards and crops badly damaged.	Do.
Waterville, Kans. (5 miles southwest)	6	4:30 p. m.	300		5,000	Small tornado	Farm buildings wrecked; path, 900 yards long.	Do.
Salina, Kans., and vicinity	6	5 p. m.	6 mi.		10,000	Hail	Much damage to greenhouses and wheat; path, 15 miles long.	Do.
Lincoln, Nebr.	6	5:45 p. m.	2 mi.		80,000	do.	Chief damage to roofs, windows and greenhouses; path, 2 miles long.	Do.
Elk (near), Kansas	6	6 p. m.	300		3,000	Tornado and hail	Farm property damaged; path, 10 miles long.	Do.
Wilson County, Kans.	6	6-7 p. m.			14,000	Hail	Character of damage not reported.	Do.
Olathe, Kans., and vicinity	6	7 p. m.	1,760		60,000	Hail and wind	Chief damage to wheat and oats; trees stripped; path 10 miles long.	Do.
Shattuck, Okla.	6	7 p. m.	3 mi.			do.	Heavy crop loss; path, 6 miles long.	Do.
Eureka (near)	6	7:30 p. m.	17		100	Small tornado	Small farm buildings damaged; path 1,300 yards long.	Do.
Independence, Kans., and vicinity	6	8:30 p. m.	900		1,000	Hail	Greenhouses and fruit damaged; path 1 mile long.	Do.
Greensburg, Pa., and vicinity	6	10 p. m.	880		5,000	Wind	Several farm buildings demolished.	Do.
Pennsylvania (northeastern)	6	P. m.			250,000	Wind, electrical, hail and rain	Extensive damage to buildings and other property.	Do.
Evansville, Ind., and vicinity	6					Thunderstorm and wind	Some delay caused by flooding of streets and sewers; other property damaged.	Do.
Missouri (northwestern)	6		½-4 mi.		75,000	Hail, wind, and rain	Orchards and field crops severely damaged; windows broken.	Do.
Mounds, Ill., and vicinity	6-7		3 mi.		10,850	Hail	Fruits and vegetables injured 25 to 90 per cent; roofs, auto tops, and tents pierced; path 5 miles long.	Do.

¹ "Mi" signifies miles instead of yards.

Severe local storms, June, 1931—Continued

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
Pennsylvania (South-central)	7				\$100,000	Electrical, wind, and hail.	Buildings unroofed; trees uprooted; stock killed.	Official, U. S. Weather Bureau.
Frederick and Carroll Counties, Md.	7	3:30 p. m.				Wind	Several small buildings unroofed; many trees and a few poles blown down.	Do.
Chickasaw County, Iowa	8	2 a. m.	1,760		2,000	Hail	Crops injured; path 4 miles long.	Do.
Davidson, Okla.	8	5 p. m.	1,760		2,000	do	Cotton crop injured; path 2 miles.	Do.
Duke (near), Okla.	9	6 p. m.	2.5 mi.		25,000	do	Chief damage to crops; path 4 miles long.	Do.
Clark County, Kans.	10	4 p. m.	3 mi.		15,000	do	Wheat loss 50 to 100 per cent; windows and autos damaged; path 10 miles long.	Do.
Reno County, Kans.	10	6:30 p. m.			50,000	do	Farm property severely damaged.	Do.
Union (near), Okla.	10	7 p. m.			25,500	do	Considerable crop loss; minor property damage.	Do.
Glasco (near), Kans.	10	8 p. m.			1,000	Small tornado	Residence and implement shed wrecked; path 4 miles long.	Do.
Concordia to Belleville, Kans.	10	8:30 p. m.			500	Violent wind and probably small tornado.	Number of small buildings unroofed.	Do.
Mayfield, Kans., and vicinity	10	P. m.	3 mi.			Hail	Wheat total loss; other crops badly injured; path 7 miles long.	Do.
Pryor, Okla., and vicinity	11	2:30 p. m.	2 mi.		12,000	do	Chief damage to crops; path 8 miles long.	Do.
Rochelle (near), Tex.	11	4 p. m.	150			Tornado	4 persons injured; character of damage not reported.	Do.
San Saba (near), Tex.	11	5 p. m.	2,640			Hail	Crops damaged; livestock killed.	Do.
Greenville, Commerce, and Cooper, Tex.	11	6:45 p. m.	12 mi.			Wind	Buildings unroofed; chimneys, poles, and trees blown down.	Do.
Deport, Tex.	11	8 p. m.			10,000	do	Buildings damaged.	Do.
Princeton (near), Tex.	11	8:30 p. m.	1,320		1,000	Wind and hail	Some damage to buildings and crops.	Do.
Boone County, Nebr. (western)	12	3 p. m.	1,760		9,000	Hail	Considerable crop damage in places.	Do.
Brownfield (near), Tex.	12	7 p. m.	2 mi.		5,000	do	Crops ruined.	Do.
Kossuth County, Iowa	12	10 p. m.	4 mi.		4,000	Wind	Windmills and buildings damaged; path, 6 miles long.	Do.
Tupelo (near), Miss.	12	11 p. m.				Probably tornado	Crops and trees damaged.	Do.
Hamlin (near), Tex.	12	P. m.	3 mi.			Hail	Crops ruined.	Do.
Princeton, Ind.	12				3,000	Wind	Buildings damaged.	Do.
Sherman County, Kans. (eastern)	12	P. m.			6,000	Hail	Wheat injured.	Do.
Duplin County, N. C. (northwestern)	13	5 p. m.	880		100,000	Hail and wind	Damage chiefly to crops; 4 barns and other small buildings blown down.	Do.
Albemarle County, Va. (southwestern)	13	8:30-11:30 p. m.	½-6 mi.		30,000	Hail	Fruits, chiefly apples, damaged.	Do.
Garden City, Kans.	13					do	4,000 acres of wheat damaged.	Do.
South Byron, N. Y.	14	3-5 p. m.	2,640		10,000	do	Peas and tomatoes damaged.	Do.
Rush Center and vicinity, Kans.	14	4-5 p. m.	2 mi.		10,000	do	Wheat damaged 40 per cent; path, 5 miles long.	Do.
Amarillo, Tex. (east of)	14	6 p. m.			10,000	do	Considerable crop damage.	Do.
Spearmen (near), Tex.	14	6:30 p. m.	2 mi.		50,000	do	Much loss to crops.	Do.
Rice and Reno Counties, Kans.	14	7-9 p. m.	4 mi.		600,000	do	Heavy damage to wheat, apples, and gardens; windows and auto tops pierced; path, 35 miles long.	Do.
Harvey County, Kans.	14	9-9:30 p. m.	2 mi.		70,000	do	Heavy damage to automobiles, roofs, and windows; traffic delayed; path, 12 miles long.	Do.
Hancock County, Ga. (southern)	14				2,000	do	Crops injured.	Do.
Buffalo, N. Y.	14					Wind and thunderstorm.	House blown down and large smokestack damaged.	Do.
Waycross, Ga.	14				5,000	Wind	Church demolished and several roofs blown off; 2 persons injured.	Do.
Bickleton, Wash.	15	6:30 p. m.	1,760		5,000	Hail	Grains, gardens, shrubbery, and windows damaged.	Do.
Montezuma, Ga.	15					Wind	Small barns, tenant house, and church wrecked.	Do.
Trenton, S. C.	15				6,000	Thunderstorm	Cotton gin burned.	Do.
Montana (northwestern counties)	16				16,300	Hail	Damage chiefly to crops.	Do.
Dallas, Tex.	17	5:10 p. m.			60,000	Thunderstorm	Oil tank struck by lightning and burned.	Do.
Doretta, Mont.	17	Noon	2 mi.			Hail	Considerable damage, character not reported.	Do.
Clay and Chickasaw Counties, Iowa	18	11:30 p. m.—midnight.			22,000	Wind	Buildings wrecked.	Do.
Winneshiek, Wayne, and Benton Counties, Iowa	19	A. m.			14,500	do	Buildings and crops damaged.	Do.
Wessington (near), S. Dak.	19	4:30 p. m.	880		32,500	Tornado and hail	Farm buildings wrecked.	Do.
Davison to Lake County, S. Dak.	19	7 p. m.	10 mi.		12,000	Wind and hail	Windmills blown down; crops and farm buildings damaged.	Do.
Kossuth County, Iowa	19	10 p. m.			500	Tornado	Buildings damaged.	Do.
Mallard (near), Iowa	19	do			7,300	do	Damage chiefly to farm property; path, 1 mile long.	Do.
Sioux Rapids (near), Iowa	19	do	67			Tornado and wind	Property on 5 farms damaged; path, 5 miles long.	Do.
Hayfield (near), Iowa	19	10:30 p. m.		1	24,000	do	Trees, buildings, and telephone equipment damaged; 4 persons injured; path, 6 miles long.	Do.
Deerfield (near) to Alta Vista, Iowa	19	11-11:30 p. m.			70,000	do	Buildings and crops heavily damaged; livestock killed or injured.	Do.
Waterloo, Iowa	19	11:40 p. m.	267		8,000	Tornado	Character of property damaged not reported; path, 2 miles.	Do.
Garwin (near), Iowa	19	11:45 p. m.			1,200	do	Buildings and trees damaged; path, 6 miles long.	Do.
Carroll and Cherokee Counties, Iowa	19				45,000	Wind and hail	Considerable damage to crops.	Do.
Lyndonville and Wilson, N. Y.	19				14,000	Electrical	Several buildings burned.	Do.
Whitehall (near) and Neilsville (near), Wis.	19				3,000	Thunderstorm and hail	Several barns and other farm buildings damaged.	Do.
Jerico, Iowa (north of)	20	12:15 p. m.			13,000	Tornado and wind	Buildings and crops damaged; path, 7 miles long.	Do.
Walthill, Nebr. (4 miles southwest)	20	4 p. m.	880			Hail	Crops considerably damaged; path, 1 mile long.	Do.
Cass, Pottawattamie, Shelby, and Humboldt Counties, Iowa	20	P. m.			208,000	Wind and hail	Heavy crop loss; buildings damaged.	Do.
Central and southern counties, New York	20	do		1		Severe electrical and wind.	Many trees blown down; several barns wrecked; much damage to roofs, buildings, and wires; livestock killed.	Do.
Green and Sac counties, Iowa	20				6,000	Hail	Crops damaged.	Do.
Guthrie, Harrison, Hancock, Linn, and Winneshiek Counties, Iowa	20				24,000	Wind	Crops and buildings damaged.	Do.
Montana (southeastern counties)	21					Hail	Growing crops hurt.	Do.
Pocahontas County, Iowa	22	1:30-2 p. m.			25,000	Wind and hail	Crops damaged.	Do.
Newton, Ill., and vicinity	22	3:30 p. m.				do	Number of buildings damaged; poles and trees blown down, electric service interrupted; fruit and grain crops hurt.	Do.

Severe local storms, June, 1931—Continued

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
Marshall County, Iowa.....	22	9 p. m.			\$14,000	Wind.....	Buildings, fruit trees, and crops injured.....	Official, U. S. Weather Bureau.
Elgin (near), Ill.....	22					Wind and rain.....	Wheat and oats on several farms almost a total loss.	Do.
De Kalb County, Ill. (northern).....	22					Wind, hail, and rain.	Oats, hay, fruit, and gardens almost total loss in places; roofs damaged; wire services interrupted.	Do.
Dubuque, Iowa.....	22					Wind.....	Factories and residence considerably damaged.	Do.
Macoupin County, Ill. (central).....	22					do.....	Several buildings damaged; trees and wheat blown down.	Do.
Montana (northeastern counties).....	22					Hail.....	Growing crops damaged.....	Do.
Hopkins, S. C.....	23	9-10 p. m.			3,000	Hail and wind.....	Crops, cabins, and outbuildings damaged.....	Do.
Montana (south-central counties).....	23					Hail.....	Growing crops damaged.....	Do.
Evansville, Ind., and vicinity.....	24				30,000	Electrical.....	Telephone lines, homes and other buildings damaged.	Do.
Franklin County, Miss.....	24			1		Thunder squall.....	Residences damaged.....	Do.
Statesboro (near), Ga.....	25					Wind.....	Several tobacco barns damaged; many trees blown down.	Do.
Michigan (straits to southern boundary).....	26	4:30-9 a. m.		2		Wind, electrical and rain.	Many buildings damaged; trees uprooted.....	Do.
Sunbury, Pa., and vicinity.....	26				10,000	Electrical.....	Garages and autos wrecked; crops damaged.....	Do.
Ohio (northern).....	26-27			4		Thunderstorms and wind.	Extensive destruction of property of all kinds; Cleveland hardest hit; 1 person injured.	Do.
Montana (east-central counties).....	28					Hail.....	Crops damaged.....	Do.
Kettle Falls, Wash.....	29	2:30 p. m.			25,000	Thunder and hail.	Chief damage to apple crop.....	Do.
Thomas to Sedan (near), N. Mex.....	29	3-4:15 p.m.				Hail.....	Considerable damage, character not reported; path 15 miles long.	Do.
Rock Hill, S. C.....	29	P. m.			3,000	Hail and wind.....	Character of damage not reported.....	Do.
Montana (north-central and central counties).....	29				100,000	Hail.....	Severe crop damage.....	Do.
Indiana.....	29					11 severe wind storms.	Character of damage not reported.....	Do.
Bunker Hill, Ill.....	30	6 p. m.	3 mi.		10,000	Wind.....	Buildings damaged or wrecked; poles and trees blown down; crops flattened; path 5 miles.	Do.
Gordo (near), Ala.....	30					Wind and hail.....	Number of small buildings wrecked; trees uprooted.	Do.
Hernando, Miss., and vicinity.....	30				3,000	Violent wind and hail.	Character of damage not reported.....	Do.
Literbury, Ill., and vicinity.....	30					Wind and rain.....	Small buildings and crops damaged; 2 persons injured.	Do.

RIVERS AND FLOODS

By MONTROSE W. HAYES

Many of the rivers in the mid-western and far-western States were still at very low stages in June, and in no part of the country were there any river rises of importance. Heavy rains in northeastern Missouri and southern Kansas overflowed creeks, and caused damage estimated at \$9,000 in Missouri and \$4,000 in Kansas.

Table of bankful stages in June, 1931

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ATLANTIC SLOPE DRAINAGE					
Connecticut: Hartford, Conn.-----	<i>Feet</i> 16	10	13	<i>Feet</i> 17.6	11
MISSISSIPPI SYSTEM					
<i>Upper Mississippi Basin.</i>					
Illinois: Peru, Ill.-----	14	25	25	14.1	25
<i>Arkansas Basin.</i>					
Fountain: Fountain, Colo.-----	8	25	25	8.6	25
GULF OF CALIFORNIA DRAINAGE					
Colorado: Parker, Ariz.-----	7	1	30	8.0	10-15
PACIFIC SLOPE DRAINAGE					
<i>Columbia Basin.</i>					
Columbia: Marcus, Wash.-----	24	12	16	24.2	13, 14